

Member Aggregation Logic

The following is a summary of logic related to a member aggregation¹. A member aggregation relates to the existence of a general dimension and how the members within that dimension are organized and characterized. A member aggregation can be used to distinguish facts within a concept arrangement pattern of Set, Roll Up, Roll Forward, Arithmetic.

Examples

XBRL Cloud: <https://xbrlsite.azurewebsites.net/2019/Prototype/conformance-suite/Production/1000-ConceptArangementPatterns/04-CompoundFact/evidence-package/>

Luca Suite:

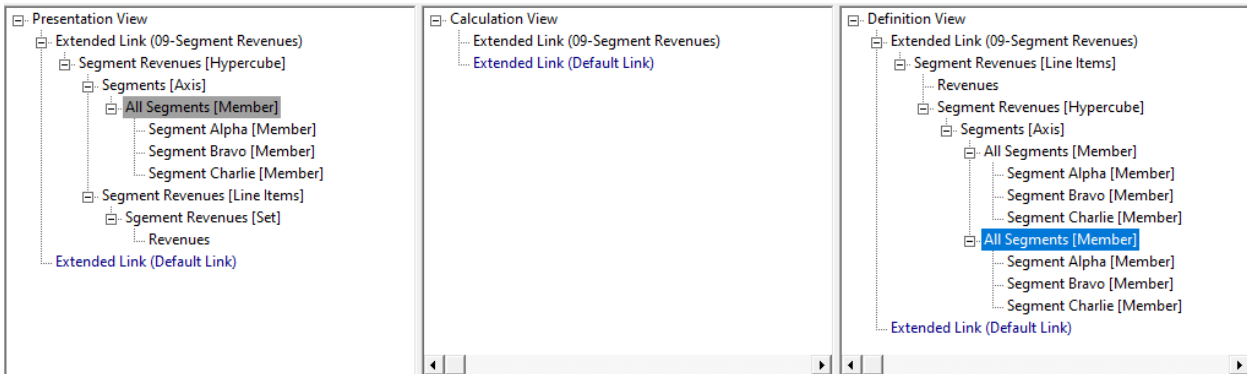
https://luca.pacioli.ai/luca/view/0f24fd35e961e167a727b663c75a4c5ec9fb7eb86730d6292f46e6e180fc2018_NGnGqcuwN7o/index

Test case: <http://xbrlsite.com/seattlemethod/platinum-testcases/25-TestCase-member-aggregation.xml>

Pesseract:

Rendering	Model Structure	Fact Table	Business Rules Structure	Business Rules Validation Results	Elements
Component: (Network and Table)					
Network	09 - Unknown - Segment Revenues				
Table	Segment Revenues [Hypercube]				
Reporting Entity [Axis]	GH259400TOMPUOLS65II http://standards.iso.org/iso/17442				
Period [Axis]	2020-01-01/2020-12-31				
Unit [Axis]	USD				
Segments [Axis]					
Segment Revenues [Line Items]	Segment Alpha [Member]	Segment Bravo [Member]	Segment Charlie [Member]	All Segments [Member]	
Segment Revenues [Set]					
Revenues	1,000	4,000	2,000	7,000	

The following is an example of a modeling of a roll up logical pattern using XBRL:



Brief Description

¹ Member aggregation, <http://www.xbrlsite.com/seattlemethod/platinum-testcases/member-aggregation/>

A **member aggregation** member arrangement pattern distinguishes facts using a dimension and the facts sum to a total or aggregation. For example, below you see that the fact or line item “Revenues” is broken down by segment and the information for each fact is distinguished using the Segments [Axis] (a.k.a. dimension), a member for each segment, and another member for the total of all segments.

Concept [Aspect]	Period [Aspect]			
	2020-01-01 2020-12-31			
	Segments [Axis]			
	Segment Alpha [Member]	Segment Bravo [Member]	Segment Charlie [Member]	All Segments [Member]
Segment Revenues [Set]				
Revenues	1,000	4,000	2,000	7,000

A member aggregation in the case above is used to distinguish the concepts of a [Set]. A member aggregation can just as well be used to distinguish [Line Items] which are a Roll Up, Roll Forward, Arithmetic, etc.

Axioms

1. A member aggregation is information that helps characterize is a type of information block object.
2. A member aggregation always has a minimum of one Dimension and some set of members. (1 member makes no sense, 2 may make sense but not really, 3 or more makes more sense)
3. A member aggregation relates to the members of a dimension which aggregate.
4. The [Line Items] of a member aggregation could be a [Roll Up], a [Set], a [Roll Forward].
5. The pseudo mathematical formula is: Total = Sum(Each). Meaning the total or root member of the dimension is equal to the sum of each of the members.
6. The calendar period type of each concept within the set of [Line Items] of a member aggregation MUST be the same.
7. The data type of each concept within the set of [Line Items] of a member aggregation MUST be the same.
8. The units of each fact within a member aggregation MUST be the same.
9. A member aggregation is modeled using XBRL:
 - a. Presentation relations show an [Abstract] element within the [Line Items] which organizes the concepts into one of the known logical patterns. (i.e. Set, Roll Up, Roll Forward)
 - b. Calculation relations always exist, by definition, if the [Line Items] concept arrangement pattern logic is a Roll Up.
 - c. Definition relations always exist as XBRL dimensions is used to represent the members of the member aggregation.
 - d. XBRL formulas are used to represent the member aggregation.
10. The root member and dimension default as defined in the XBRL relations is always the total member, all other members are summed and must agree to that total.

Member aggregation of a Set:

Director Compensation [Line Items]	Period [Axis]		
	2010-01-01 - 2010-12-31		
	Director [Axis]		
	John Doe [Member]	Jane Doe [Member]	Directors, All [Member]
Director [Hierarchy]			
Director, Salary	1,000	1,000	2,000
Director, Bonuses	1,000	1,000	2,000
Director, Fees	1,000	1,000	2,000
Director, Options Granted, at Fair Value	1,000	1,000	2,000

Member aggregation of a roll up:

Concept [Aspect]	Period [Aspect]			
	2022-01-01 2022-12-31			
	Instrument [Dimension]			
	North West-One [Member]	Hyster 1 [Member]	Hyster 2 [Member]	All Instruments [Member]
Interest Expense [Roll Up]				
Interest Paid	\$ 0	\$ 0	\$ 0	\$ 0
Interest Accrued	0	0	0	0
Interest Accrual Reversed	0	0	0	0
Interest Expense	\$ 0	\$ 0	\$ 0	\$ 0

Member aggregation with two dimensions:

Sales Analysis, by Geographic Area [Line]	Period [Axis]													
	2010-01-01 - 2010-12-31						2009-01-01 - 2009-12-31							
	Geographic Area [Axis]						Geographic Area [Axis]							
	North America Region [Member]			Europe Region [Member]			North America Region [Member]			Europe Region [Member]				
	Country [Axis]	Country [Axis]	Country [Axis]	Country [Axis]	Country [Axis]	Country [Axis]	Country [Axis]	Country [Axis]	Country [Axis]	Country [Axis]	Country [Axis]	Country [Axis]		
Sales Analysis, by Geographic Area [Hierarchy]	United States [Member]	Canada [Member]	Countries, All [Member]	United Kingdom [Member]	Germany [Member]	Countries, All [Member]	Countries, All [Member]	United States [Member]	Canada [Member]	Countries, All [Member]	United Kingdom [Member]	Germany [Member]	Countries, All [Member]	Countries, All [Member]
Sales	4,000,000	2,000,000	6,000,000	2,000,000	2,000,000	4,000,000	10,000,000	4,000,000	2,000,000	6,000,000	2,000,000	2,000,000	4,000,000	10,000,000

<https://xbrlsite.azurewebsites.net/DigitalFinancialReporting/MemberArrangementPatterns/2017-05-07/MAP05-MultipleCharacteristics/evidence-package/>